

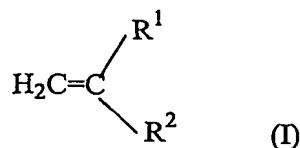
CLAIMS

5 1. Core-shell nanoparticles comprising:

- a core which comprises a water insoluble polymer or copolymer, and
- a shell which comprises a hydrophilic polymer or copolymer;

said nanoparticles being obtainable by emulsion polymerization of a mixture comprising, in an aqueous solution, at least one water-insoluble styrenic, acrylic or methacrylic monomer
10 and:

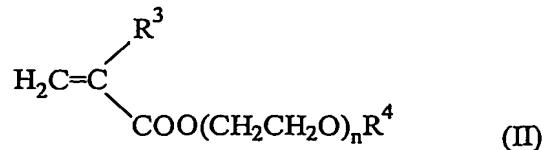
(i) a monomer of formula (I):



wherein

15 R^1 represents hydrogen or methyl, and
 R^2 represents $-\text{COOAOH}$, $-\text{COO}-\text{A}-\text{NR}^9\text{R}^{10}$ or $-\text{COO}-\text{A}-\text{N}^+\text{R}^9\text{R}^{10}\text{R}^{11}\text{X}^-$, in which A represents C_{1-20} alkylene, R^9 , R^{10} and R^{11} each independently represent hydrogen or C_{1-20} alkyl and X^- represents halogen, sulphate, sulphonate or perchlorate, and
a water-soluble polymer of formula (II)

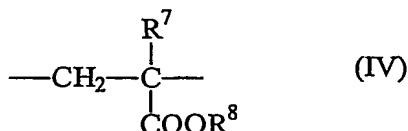
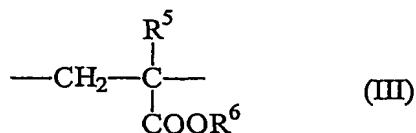
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wherein

R^3 represents hydrogen or methyl,
 R^4 represents hydrogen or C_{1-20} alkyl, and
 n is an integer such that the polymer of formula (I) has a number-average molecular weight of at
25 least 1000; or

(ii) a hydrophilic copolymer which comprises repeating units of formulae (III) and (IV):



5 wherein

R^5 and R^7 each independently represent hydrogen or methyl,
 R^6 represents hydrogen, $-\text{A}-\text{NR}^9\text{R}^{10}$ or $-\text{A}-\text{N}^+\text{R}^9\text{R}^{10}\text{R}^{11}\text{X}^-$, in which A represents C_{1-20} alkylene,
 R^9 , R^{10} and R^{11} each independently represent hydrogen or C_{1-20} alkyl and X represents halogen,
sulphate, sulphonate or perchlorate and
10 R^8 represents C_{1-10} alkyl.

2. Nanoparticles according to claim 1 wherein the core comprises poly(C_{1-10} alkyl (meth)acrylate), polystyrene or a copolymer formed from monomers which are acrylic, methacrylic or styrenic monomers.

3. Nanoparticles according to claim 1 or 2 wherein the core comprises poly(methyl 15 methacrylate).

4. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion polymerization of methyl methacrylate in an aqueous solution comprising poly(ethylene glycol) methyl ether methacrylate and 2-(dimethyloctyl) ammonium ethyl methacrylate bromine.

5. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion 20 polymerization of methyl methacrylate in an aqueous solution comprising a copolymer of methacrylic acid and ethyl acrylate.

6. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion polymerization of methyl methacrylate in an aqueous solution comprising a copolymer of 2-(dimethylamino)ethyl methacrylate and C_{1-6} alkyl methacrylate.

25 7. Nanoparticles according to any one of the preceding claims which have a number-average particle diameter measured by scanning electron microscopy of from 50 to 1000 nm.

8. Nanoparticles according to any one of the preceding claims which further comprise a fluorescent chromophore.
9. A process for preparing nanoparticles according to any one of the preceding claims, said process comprising emulsion polymerization of a water-insoluble monomer in an aqueous solution comprising:
 - (i) a monomer of formula (I) and a polymer of formula (II), or
 - (ii) a hydrophilic copolymer which comprises repeating units of formulae (III) and (IV).
10. Nanoparticles according to any one of claims 1 to 8 which further comprise at least one pharmacologically active agent adsorbed at the surface of the nanoparticles.
11. Nanoparticles according to claim 10 wherein the pharmacologically active agent is a disease-associated antigen.
12. Nanoparticles according to claim 11 wherein the antigen is a deoxyribonucleic acid, ribonucleic acid, oligodeoxynucleotide, oligonucleotide or protein.
13. Nanoparticles according to claim 11 or 12 wherein the antigen is a microbial antigen or a cancer-associated antigen.
14. Nanoparticles according to any one of claims 11 to 13 wherein the antigen is a human immunodeficiency virus-1 (HIV-1) antigen.
15. Nanoparticles according to claim 14 wherein the antigen is HIV-1 Tat protein or an immunogenic fragment thereof.
16. A process for preparing nanoparticles according to any one of claims 10 to 15, said process comprising adsorbing a pharmacologically active agent at the surface of nanoparticles according to any one of claims 1 to 8.
17. A pharmaceutical composition comprising nanoparticles according to any one of claims 10 to 15 and a pharmaceutically acceptable excipient.
18. A method of diagnosing, treating or preventing a condition in a subject said method comprising administering an effective amount of nanoparticles according to any one of claims 10 to 15 or a pharmaceutical composition according to claim 17 to a subject in need of such treatment.
19. A method of generating an immune response in a subject, said method comprising administering nanoparticles according to any one of claims 11 to 15 in a therapeutically effective amount.

20. A method of preventing or treating HIV infection or AIDS, said method comprising administering nanoparticles according to any one of claims 11 to 15 in a therapeutically effective amount.
21. Nanoparticles according to any one of claims 10 to 15 or a pharmaceutical composition according to claim 17 for use in a method of treatment of the human or animal body by therapy or a diagnostic method practised on the human or animal body.
22. Use of nanoparticles according to any one of claims 10 to 15 for the manufacture of a medicament for diagnosing, treating or preventing a condition in a subject.
23. Use of nanoparticles according to any one of claims 10 to 15 for the manufacture of a medicament for preventing or treating HIV infection or AIDS.